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Attorney Docket No. 42P10857

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In re the Patent Application of:

John S. Howard, et al.

Application No. 09/823,558

Filed: March 30, 2001

For: **NAK THROTTLING FOR USB HOST CONTROLLERS**

Examiner: Khanh Dang

Art Unit: 2181

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicant submits, in triplicate, the following Appeal Brief pursuant to 37 C.F.R. § 1.192 for consideration by the Board of Patent Appeals and Interferences. Applicant also submits herewith a check in the amount of $330.00 to cover the cost of filing the opening brief as required by 37 C.F.R. § 1.17(c). Please charge any additional amount due or credit any overpayment to deposit Account No. 02-2666.

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TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

John S. Howard and John I. Garney, the inventors named in the application, assigned their rights to that disclosed in the subject application through an assignment recorded March 30, 2001 (011672/0855) to Intel Corporation, of Santa Clara, California. Thus, as the owner at the time the brief is being filed, Intel Corporation, of Santa Clara, California is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that will directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-28 are pending in the present application. The Examiner has rejected all pending claims. Applicant hereby appeals the rejection of all the pending claims.

IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the Final Office Action having a mailing date of January 14, 2004.

V. SUMMARY

A system and a related method are disclosed for enabling a bus master/host controller to skip, during the traversal of a schedule, schedule elements which have issued a threshold number of flow control events. (Specification, page 2, lines 12-15). The system includes a bus master or host controller that traverses the schedule having a number of elements, each element containing information pertaining to a particular endpoint. (Specification, page 3, lines 3-5; and page 4, lines 6-8). The system counts flow control events issued by individual endpoints. (Specification, page 3, lines 13-25). The system skips elements in the traversal of the schedule, which have issued a threshold number of flow control events. (Specification, page 3, lines 27-36). By doing so, the bus master may save bus time by skipping elements which have issued a threshold number of flow control events and rewarding elements that are willing to move data. (Specification, page 3, line 36 to page 4, line 2).

Under certain conditions, the bus master may stop traversal of the schedule for a period of time. (Specification, page 4, lines 28-33). Once the bus master wakes from this idle state, it can resume traversal of the schedule and reset all element counters to an initial value. (Specification, page 4, lines 33, 35).

VI. ISSUES

The issues involved in this appeal are as follows:

Under 35 U.S.C. 102(e), are Claims 1-8, 10-17, 19, 22-24, 27 and 28 anticipated by U.S. Patent No. 6,311,294 to Larky, et al. (Larky)?

Under 35 U.S.C. 102(e), are Claims 1-19, 22-24, 27 and 28 anticipated by U.S. Patent No. 6,073,193 to Yap (Yap)?

Under 35 U.S.C. 103(a), are Claims 9, 18, 20, 21, 25 and 26 unpatentable over Larky?

VII. GROUPING OF CLAIMS

Applicant contends that the claims can be divided into the following groups and that each group of claims is separately patentable. These groups are as follows:

Group I -- Claims 1, 10;

Group II -- Claims 2, 11;

Group III -- Claims 3, 4, 12, 13;

Group IV -- Claims 5-8, 14-17;

Group V -- Claims 9, 18;

Group VI -- Claims 19, 22, 23;

Group VII -- Claims 24, 27 28;

Group VIII -- Claims 20, 25; and

Group IX -- Claims 21, 26.

Applicant discusses below the reasons why each group of claims is separately patentable.

VIII. ARGUMENT

A. Overview of the Cited Art

1. Overview of Larky

Larky describes a system for enabling bulk data retrieval using a universal serial bus. (Larky, column 3, lines 7-11). The system communicates data from a Universal Serial Bus (USB) device to a USB host device over a USB in which the USB device indicates to the host that data is available for communication to the host and the host communicates data requests to the device once the data available signal is received by the host. (Larky, column 3, lines 38-44). Then, the data is communicated from the USB device to the host device. (Larky, column 3, lines 44-45). Once the device has no more data to transfer for a predetermined period of time, the device communicates a flag to the host indicating that no more data is retrievable and the host halts the data requests when the flag is received. (Larky, column 3, lines 45-49). In this regard, Larky discloses employing a timer to measure the amount of time during which a device has no bulk data to send (e.g., represented by sending NAKs instead). (Larky, column 5, lines 57-59). Once the device has been sending NAKs for a predetermined period of time, the device will send a signal to the host to stop sending IN tokens (e.g., data requests) until the device sends a data available signal. (Larky, column 3, lines 24-30). Absent from Larky is any teaching or suggestion of counting flow control events issued by individual endpoints. Furthermore, absent from Larky is any teaching or suggestion of skipping elements in the traversal of a schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events.

2. Overview of Yap

Yap describes a system for disconnecting certain data lines to recover from a USB device brown out condition. (Yap, column 2, lines 6-9; column 5, lines 53-63). The counter used by Yap is incremented based on how long a USB microcontroller has been busy. (Yap, column 5, lines 30-63). Once a threshold time period has been reached, which suggests that a brown out condition has occurred, the data lines of that specific USB microcontroller are disconnected for a predetermined amount of time and then re-connected. (Yap, column 5, lines 53-63; column 6, lines 24-32). Absent from Yap is any teaching or suggestion of counting flow control events issued by individual endpoints. Furthermore, absent from Yap is any teaching or

suggestion of skipping elements in the traversal of schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events.

B. Group I: Rejection of Claims 1 and 10 Under 35 U.S.C. §102(e) as Being Anticipated by Larky

The Examiner rejects Claims 1 and 10 under 35 U.S.C. §102(e) as being anticipated by Larky. To anticipate a claim, every element of the claim must be disclosed within a single reference. Thus, if even one feature of Claims 1 and 10 is not found in Larky, Applicant respectfully submits that the rejection of Claims 1 and 10 under 35 U.S.C. § 102 must be overturned.

Claim 1 recites a method comprising: traversing a schedule with a bus master, the schedule having a plurality of elements, each element having information pertaining to one of a plurality of endpoints; executing transactions on a bus in accordance with the information pertaining to the plurality of endpoints; counting flow control events issued by individual endpoints; and skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events.

Applicant respectfully submits that Larky fails to teach or suggest "counting flow control events issued by individual endpoints" as recited in Claim 1. Larky discloses employing a timer to measure the amount of time during which a device has no bulk data to send (e.g., represented by sending NAKs instead). Once the device has been sending NAKs for a predetermined period of time, the device will send a signal to the host to stop sending IN tokens (e.g., data requests) until the device sends a data available signal (Col. 3, lines 24-30 of Larky). In this regard, Larky does disclose a counter for counting down a time-out period during which a device has no bulk data to send (e.g., represented by sending a NAK signal). However, Applicant finds no teaching or suggestion in Larky of counting flow control events issued by individual endpoints as claimed by Applicant.

There may be a number of disadvantages associated with the system described by Larky that utilizes a timer by which the system elects to no longer send data requests to the dry device. Such a configuration can potentially result in various devices being prematurely denied service by the host if the device is timed out too early. For example, if a large number of devices are connected to the bus, and the first device sends a NAK, the timer for that device will begin

counting. Due to the large number of devices on the bus and perhaps different latency periods of each of those devices, it may take the host a significant amount of time to send data requests to each device on the bus such that the first device may timeout prematurely even though it has only sent one NAK.

Such a problem would not occur with the method recited in Applicant's independent Claim 1, which provide additional granularity to the system by requiring a specific threshold number of flow control events that must be counted prior to suspending services to a specific endpoint. Such granularity and the efficiencies derived therefrom cannot be achieved by following the teachings of Larky. Thus, Larky does not disclose the use of a counter or any other mechanism to count the actual number of flow control events issued by each endpoint, as recited in Claim 1. At least for this reason, Applicant submits that Claim 1 is not anticipated by Larky.

In addition, Applicant respectfully submits that Larky fails to teach or suggest "skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events" as recited in Claim 1. As to this limitation, the Examiner has failed to point out where this limitation of Claim 1 is found within Larky. In the Office Actions dated August 27, 2003 and January 14, 2004, the Examiner merely asserts that "Larky et al. discloses ... that bus master suspends services to an endpoint which has issued a threshold number of flow control events (a threshold number of NAK signal, for example)" without specifically identifying where the alleged teachings could be found in Larky. Applicant likewise cannot find any such teaching or suggestion. Accordingly, since Larky fails to teach "skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events" as recited in Claim 1, Larky cannot anticipate Claim 1.

Furthermore, in rejecting Claim 1, the Examiner asserts that the counter employed by Larky is used to count down one or more USB data frames and thus the counter employed by Larky does indeed count the number of flow control events such as NAKs. In doing so, it appears that the Examiner is equating "counting USB data frames" described in Larky as "counting flow control events (such as NAKs) issued by individual endpoints" as recited in Claim 1. Assuming solely for the sake of argument that the Examiner's assertion is correct and that "USB data frames" described in Larky is equivalent to "flow control events" recited in Claim 1, there is no teaching or suggestion in Larky of skipping elements in the traversal of the

schedule, which have issued a threshold number of "USB data frames" (which the Examiner equates as "flow control events) as required by Claim 1. Thus, the Examiner's analysis of Claim 1 creates a logical quandary, which necessarily requires that the rejection be overturned.

In view of the foregoing, Applicant respectfully submits that the rejection of Claim 1 under 35 U.S.C. §102 as being anticipated by Larky is in error.

Analogous arguments and discussion apply to independent Claim 10. Particularly, with respect to independent Claim 10, Applicant respectfully submits that Larky fails to teach or suggest "counting flow control events issued by individual endpoints" and "skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events", as recited in Claim 10. Accordingly, Applicant respectfully submit that the rejection of Claim 10 under 35 U.S.C. §102 as being anticipated by Larky is in error.

C. Group I: Rejection of Claims 1 and 10 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

The Examiner rejects Claim 1 under 35 U.S.C. §102(e) as being anticipated by Yap. To anticipate a claim, every element of the claim must be disclosed within a single reference. Thus, if even one feature of Claim 1 is not found in Yap, Applicant respectfully submits that the rejection of Claim 1 under 35 U.S.C. § 102 must be overturned.

With respect to Claim 1, Applicant respectfully submits that Yap does not teach or suggest "counting flow control events issued by individual endpoints" as recited in Claim 1. Rather, Yap discloses a system for disconnecting certain data lines to recover from a USB device brown out condition (Col. 2, lines 6-9; Col. 5, lines 53-63). The counter used by Yap is incremented based on how long a USB microcontroller has been busy. What Applicant claims is entirely different from and is not taught by Yap. Applicant claims counting flow control events issued by individual endpoints. Counting flow control events and counting the number of milliseconds during which a specific microcontroller is busy are not the same thing. Thus, it is improper to equate incrementing a counter based on how long a USB microcontroller has been busy as taught by Yap with "counting the number of flow control events issued by individual endpoints", as recited in Claim 1.

Further, Applicant respectfully submits that Yap does not teach or suggest "skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events" as recited in Claim 1. Rather, the examples and embodiments disclosed by Yap only teach counting the number of milliseconds during which a specific microcontroller is busy, and once a threshold time period has been reached, the data lines of that specific USB microcontroller are disconnected for a predetermined amount of time and then re-connected (Col. 5, lines 53-63; Col. 6, lines 24-32). Yap's disclosure of disconnecting and reconnecting data lines of a USB microcontroller once the microcontroller has been busy for a predetermined amount of time is not equivalent to "skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events" as recited in Claim 1.

In view of the foregoing, Applicant respectfully submits that the rejection of Claim 1 under 35 U.S.C. §102 as being anticipated by Yap is in error.

Analogous arguments and discussion apply to independent Claim 10. Particularly, with respect to independent Claim 10, Applicant respectfully submits that Yap fails to teach or suggest "counting flow control events issued by individual endpoints" and "skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events", as recited in Claim 10. Accordingly, Applicant respectfully submit that the rejection of Claim 10 under 35 U.S.C. §102 as being anticipated by Yap is in error.

D. Group II: Rejection of Claims 2 and 11 Under 35 U.S.C. §102(e) as Being Anticipated by Larky

Claims 2 and 11 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Larky apply here. Additionally, Claims 2 and 11 are independently patentable as Larky fails to disclose stopping traversal of the schedule by the bus master; resetting a flow control event counter for at least one endpoint to an initial value; and restarting traversal of the schedule by the bus master, as recited by Applicant. Moreover, in rejecting Claims 2 and 11, the Examiner merely asserts that "[w]ith regard to claims 1-7 and 9-17, it is clear that one using the system of Larky et al. would have performed the same steps set forth in claims 1-7, 9-17" without pointing out where

the claimed features can be found in Larky. The Examiner is obligated to examine every claim both independent and dependent. Here the Examiner has not met that obligation. Accordingly, Applicant respectfully submits that the rejection of Claims 2 and 11 as being anticipated by Larky is in error.

E. Group II: Rejection of Claims 2 and 11 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

Claims 2 and 11 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Yap apply here. Additionally, Claims 2 and 11 are independently patentable as Yap fails to disclose stopping traversal of the schedule by the bus master; resetting a flow control event counter for at least one endpoint to an initial value; and restarting traversal of the schedule by the bus master, as recited by Applicant. Moreover, in rejecting Claims 2 and 11, the Examiner merely asserts that "[w]ith regard to claims 1-18, it is clear that one using the system of Yap would have performed the same steps set forth in claims 1-18" without pointing out where the claimed features can be found in Yap. The Examiner is obligated to examine every claim both independent and dependent. Here the Examiner has not met that obligation. Accordingly, Applicant respectfully submits that the rejection of Claims 2 and 11 as being anticipated by Yap is in error.

F. Group III: Rejection of Claims 3, 4, 12 and 13 Under 35 U.S.C. §102(e) as Being Anticipated by Larky

Claims 3 and 12 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Larky apply here. Additionally, Claims 3 and 12 are independently patentable as Larky fails to disclose marking an element as a head of the schedule; stopping traversal of the schedule by the bus master if, after marking an element as the head, the bus master completely traverses the schedule without executing any transactions; and restarting traversal of the schedule by the bus master, as recited by Applicant. Moreover, in rejecting Claims 3 and 12, the Examiner merely asserts that "[w]ith regard to claims 1-7 and 9-17, it is clear that one using the system of Larky et al. would have performed the same steps set forth in claims 1-7, 9-17" without pointing out where the

claimed features can be found in Larky. The Examiner is obligated to examine every claim both independent and dependent. Here the Examiner has not met that obligation. Accordingly, Applicant respectfully submits that the rejection of Claims 3 and 12 as being anticipated by Larky is in error.

Claims 4 and 13 are dependent on patentable Claims 3 and 12, as discussed above, and those arguments are hereby incorporated regarding Claims 4 and 13. At least for this reason, Applicant respectfully submits that Claims 4 and 13 are allowable.

G. Group III: Rejection of Claims 3, 4, 12 and 13 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

Claims 3 and 12 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Yap apply here. Additionally, Claims 3 and 12 are independently patentable as Yap fails to disclose marking an element as a head of the schedule; stopping traversal of the schedule by the bus master if, after marking an element as the head, the bus master completely traverses the schedule without executing any transactions; and restarting traversal of the schedule by the bus master, as recited by Applicant. Moreover, in rejecting Claims 3 and 12, the Examiner merely asserts that "[w]ith regard to claims 1-18, it is clear that one using the system of Yap would have performed the same steps set forth in claims 1-18" without pointing out where the claimed features can be found in Yap. The Examiner is obligated to examine every claim both independent and dependent. Here the Examiner has not met that obligation. Accordingly, Applicant respectfully submits that the rejection of Claims 3 and 12 as being anticipated by Yap is in error.

Claims 4 and 13 are dependent on patentable Claims 3 and 12, as discussed above, and those arguments are hereby incorporated regarding Claims 4 and 13. At least for this reason, Applicant respectfully submits that Claims 4 and 13 are allowable.

H. Group IV: Rejection of Claims 5-8 and 14-17 Under 35 U.S.C. §102(e) as Being Anticipated by Larky

Claims 5 and 14 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Larky apply here. Additionally, Claims 5 and 14 are independently patentable as Larky fails to disclose

stopping traversal of the schedule by the bus master after all endpoints have issued the threshold number of flow control events; and restarting traversal of the schedule by the bus master, as recited by Applicant. Moreover, in rejecting Claims 5 and 14, the Examiner merely asserts that "[w]ith regard to claims 1-7 and 9-17, it is clear that one using the system of Larky et al. would have performed the same steps set forth in claims 1-7, 9-17" without pointing out where the claimed features can be found in Larky. The Examiner is obligated to examine every claim both independent and dependent. Here the Examiner has not met that obligation. Accordingly, Applicant respectfully submits that the rejection of Claims 5 and 14 as being anticipated by Larky is in error.

Claims 6-8 and 15-17 are dependent on patentable Claims 5 and 14, as discussed above, and those arguments are hereby incorporated regarding Claims 6-8 and 15-17. At least for this reason, Applicant respectfully submits that Claims 6-8 and 15-17 are allowable.

I. Group IV: Rejection of Claims 5-8 and 15-17 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

Claims 5 and 14 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Yap apply here. Additionally, Claims 5 and 14 are independently patentable as Yap fails to disclose stopping traversal of the schedule by the bus master after all endpoints have issued the threshold number of flow control events; and restarting traversal of the schedule by the bus master, as recited by Applicant. Moreover, in rejecting Claims 5 and 14, the Examiner merely asserts that "[w]ith regard to claims 1-18, it is clear that one using the system of Yap would have performed the same steps set forth in claims 1-18" without pointing out where the claimed features can be found in Yap. The Examiner is obligated to examine every claim both independent and dependent. Here the Examiner has not met that obligation. Accordingly, Applicant respectfully submits that the rejection of Claims 5 and 14 as being anticipated by Yap is in error.

Claims 6-8 and 15-17 are dependent on patentable Claims 5 and 14, as discussed above, and those arguments are hereby incorporated regarding Claims 6-8 and 15-17. At least for this reason, Applicant respectfully submits that Claims 6-8 and 15-17 are allowable.

J. Group V: Rejection of Claims 9 and 18 Under 35 U.S.C. §103(a) as Being Unpatentable over Larky

Claims 9 and 18 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Larky apply here. Additionally, Claims 9 and 18 are independently patentable as Larky fails to disclose or suggest restarting traversal of a schedule by a bus master after a fixed amount of time, in which the fixed amount of time is ten microseconds. In rejecting Claims 9 and 18, the Examiner admits that Larky does not disclose the use of ten microseconds for idled time or timeout. However, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to set the idled time or timeout to ten microseconds. Applicant submits that even if it would have been obvious to set the idled time or timeout to ten microseconds, this is insufficient, as the Examiner must show restarting traversal of the schedule by a bus master ten microseconds after the traversal of the schedule has been stopped by the bus master when all endpoints have issued the threshold number of flow control events. This showing has not been made, and it is respectfully submitted that the rejection of Claims 9 and 18 as being unpatentable over Larky is in error.

K. Group V: Rejection of Claims 9 and 18 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

Claims 9 and 18 are dependent on patentable independent Claims 1 and 10, as discussed above, and the arguments above with regard to the independent Claims 1 and 10 and Yap apply here. Additionally, Claims 9 and 18 are independently patentable as Yap fails to disclose restarting traversal of a schedule by a bus master after a fixed amount of time, in which the fixed amount of time is ten microseconds. In rejecting Claims 9 and 18, the Examiner asserts that the predetermined idled time or timeout in Yap is at least 2.5 microseconds. Yap does not disclose restarting traversal of the schedule by a bus master ten microseconds after the traversal of the schedule has been stopped by the bus master when all endpoints have issued the threshold number of flow control events. Instead, Yap teaches that when brown out condition occurs, the data lines of the USB microcontroller are opened via the switching devices for a duration greater than 2.5 microseconds and reconnected again. However, opening the data lines of the USB microcontroller when brown out condition occurs is not the same as restarting traversal of the schedule by a bus master after the traversal of the schedule has been stopped by the bus master

when all endpoints have issued the threshold number of flow control events, as recited by Applicant. Accordingly, Applicant respectfully submits that the rejection of Claims 9 and 18 as being anticipated by Yap is in error.

L. Group VI: Rejection of Claims 19, 22 and 23 Under 35 U.S.C. §102(e) as Being Anticipated by Larky

The Examiner rejects Claim 19 under 35 U.S.C. §102(e) as being anticipated by Larky. To anticipate a claim, every element of the claim must be disclosed within a single reference. Thus, if even one feature of Claim 19 is not found in Larky, Applicant respectfully submits that the rejection of Claim 19 under 35 U.S.C. § 102 must be overturned.

Claim 19 recites an apparatus comprising: a bus master to control transactions on a bus; a schedule to contain information about a plurality of endpoints, the endpoints to be coupled to the bus; and a counter to count flow control events issued by at least one of the plurality of endpoints, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events.

Applicant respectfully submits that Larky fails to teach or suggest "a counter to count flow control events issued by at least one of the plurality of endpoints, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events" as recited in Claim 19. Larky discloses employing a timer to measure the amount of time during which a device has no bulk data to send (e.g., represented by sending NAKs instead). Once the device has been sending NAKs for a predetermined period of time, the device will send a signal to the host to stop sending IN tokens (e.g., data requests) until the device sends a data available signal (Col. 3, lines 24-30 of Larky). In this regard, Larky does disclose a counter for counting down a time-out period during which a device has no bulk data to send (e.g., represented by sending a NAK signal). However, Applicant finds no teaching or suggestion in Larky of a counter to count flow control events issued by at least one of the plurality of endpoints, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events, as claimed by Applicant.

In rejecting the claims, the Examiner asserts that the counter employed by Larky is used to count down one or more USB data frames and thus the counter employed by Larky does indeed count the number of flow control events such as NAKs. In doing so, it appears that the

Examiner is equating "counting USB data frames" described in Larky as "counting flow control events (such as NAKs) issued by individual endpoints" as recited by Applicant. Assuming solely for the sake of argument that the Examiner's assertion is correct and that "USB data frames" described in Larky is equivalent to "flow control events" recited in the claims, there is no teaching or suggestion in Larky of suspending service to an endpoint which has issued a threshold number of "USB data frames" (which the Examiner equates as "flow control events) as required by Claim 19. Thus, the Examiner's analysis of the claims creates a logical quandary, which necessarily requires that the rejection be overturned.

In view of the foregoing, Applicant respectfully submits that the rejection of Claim 19 under 35 U.S.C. §102 as being anticipated by Larky is in error.

Claims 22 and 23 are dependent on patentable independent Claim 19, as discussed above, and those arguments are hereby incorporated regarding Claims 22 and 23. At least for this reason, Applicant respectfully submits that Claims 22 and 23 are allowable.

M. Group VI: Rejection of Claims 19, 22 and 23 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

The Examiner rejects Claim 19 under 35 U.S.C. §102(e) as being anticipated by Yap. To anticipate a claim, every element of the claim must be disclosed within a single reference. Thus, if even one feature of Claim 19 is not found in Yap, Applicant respectfully submits that the rejection of Claim 19 under 35 U.S.C. § 102 must be overturned.

Applicant respectfully submits that Yap fails to teach or suggest "a counter to count flow control events issued by at least one of the plurality of endpoints, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events" as recited in Claim 19. Rather, Yap discloses a system for disconnecting certain data lines to recover from a USB device brown out condition (Col. 2, lines 6-9; Col. 5, lines 53-63). The counter used by Yap is incremented based on how long a USB microcontroller has been busy. What Applicant claims is entirely different from and is not taught by Yap. Applicant claims a counter to count flow control events issued by at least one of the plurality of endpoints. Counting flow control events and counting the number of milliseconds during which a specific microcontroller is busy are not the same thing. Thus, it is improper to equate incrementing a counter based on how long a USB microcontroller has been busy as taught by Yap with "a

counter to count flow control events issued by at least one of the plurality of endpoints," as recited in Claim 19. Accordingly, Applicant respectfully submits that the rejection of Claim 19 under 35 U.S.C. §102 as being anticipated by Yap is in error.

Claims 22 and 23 are dependent on patentable independent Claim 19, as discussed above, and those arguments are hereby incorporated regarding Claims 22 and 23. At least for this reason, Applicant respectfully submits that Claims 22 and 23 are allowable.

N. Group VII: Rejection of Claims 24, 27 and 28 Under 35 U.S.C. §102(e) as Being Anticipated by Larky

The Examiner rejects Claim 24 under 35 U.S.C. §102(e) as being anticipated by Larky. To anticipate a claim, every element of the claim must be disclosed within a single reference. Thus, if even one feature of Claim 24 is not found in Larky, Applicant respectfully submits that the rejection of Claim 24 under 35 U.S.C. § 102 must be overturned.

Claim 24 recites a system comprising: a processor; memory coupled to the processor; a bus coupled to the processor and to the memory; a bus master to control transactions on the bus; at least one endpoint coupled to the bus; a schedule to contain information about the at least one endpoint coupled to the bus; and a counter to count flow control events issued by the at least one endpoint, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events.

Applicant respectfully submits that Larky fails to teach or suggest "a counter to count flow control events issued by at least one endpoint, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events" as recited in Claim 24. Larky discloses employing a timer to measure the amount of time during which a device has no bulk data to send (e.g., represented by sending NAKs instead). Once the device has been sending NAKs for a predetermined period of time, the device will send a signal to the host to stop sending IN tokens (e.g., data requests) until the device sends a data available signal (Col. 3, lines 24-30 of Larky). In this regard, Larky does disclose a counter for counting down a time-out period during which a device has no bulk data to send (e.g., represented by sending a NAK signal). However, Applicant finds no teaching or suggestion in Larky of a counter to count flow control events issued by at least one endpoint, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events, as claimed by Applicant.

In rejecting the claims, the Examiner asserts that the counter employed by Larky is used to count down one or more USB data frames and thus the counter employed by Larky does indeed count the number of flow control events such as NAKs. In doing so, it appears that the Examiner is equating "counting USB data frames" described in Larky as "counting flow control events (such as NAKs) issued by individual endpoints" as recited by Applicant. Assuming solely for the sake of argument that the Examiner's assertion is correct and that "USB data frames" described in Larky is equivalent to "flow control events" recited in the claims, there is no teaching or suggestion in Larky of suspending service to an endpoint which has issued a threshold number of "USB data frames" (which the Examiner equates as "flow control events) as required by Claim 24. Thus, the Examiner's analysis of the claims creates a logical quandary, which necessarily requires that the rejection be overturned.

In view of the foregoing, Applicant respectfully submits that the rejection of Claim 24 under 35 U.S.C. §102 as being anticipated by Larky is in error.

Claims 27 and 28 are dependent on patentable independent Claim 24, as discussed above, and those arguments are hereby incorporated regarding Claims 27 and 28. At least for this reason, Applicant respectfully submits that Claims 27 and 28 are allowable.

O. Group VII: Rejection of Claims 24, 27 and 28 Under 35 U.S.C. §102(e) as Being Anticipated by Yap

The Examiner rejects Claim 24 under 35 U.S.C. §102(e) as being anticipated by Yap. To anticipate a claim, every element of the claim must be disclosed within a single reference. Thus, if even one feature of Claim 24 is not found in Yap, Applicant respectfully submits that the rejection of Claim 24 under 35 U.S.C. § 102 must be overturned.

Applicant respectfully submits that Yap fails to teach or suggest "a counter to count flow control events issued by at least one endpoint, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events" as recited in Claim 24. Rather, Yap discloses a system for disconnecting certain data lines to recover from a USB device brown out condition (Col. 2, lines 6-9; Col. 5, lines 53-63). The counter used by Yap is incremented based on how long a USB microcontroller has been busy. What Applicant claims is entirely different from and is not taught by Yap. Applicant claims a counter to count flow control events issued by at least one of the plurality of endpoints. Counting flow control events

and counting the number of milliseconds during which a specific microcontroller is busy are not the same thing. Thus, it is improper to equate incrementing a counter based on how long a USB microcontroller has been busy as taught by Yap with "a counter to count flow control events issued by at least one endpoint," as recited in Claim 24. Accordingly, Applicant respectfully submits that the rejection of Claim 24 under 35 U.S.C. §102 as being anticipated by Yap is in error.

Claims 27 and 28 are dependent on patentable independent Claim 24, as discussed above, and those arguments are hereby incorporated regarding Claims 27 and 28. At least for this reason, Applicant respectfully submits that Claims 27 and 28 are allowable.

P. Group VIII: Rejection of Claims 20 and 25 Under 35 U.S.C. §103(a) as Being Unpatentable over Larky

Claims 20 and 25 are dependent on patentable independent Claims 19 and 24, as discussed above, and the arguments above with regard to the independent Claims 19 and 24 and Larky apply here. Additionally, Claims 20 and 25 are independently patentable as Larky fails to disclose or suggest a counter which counts flow control events issued by an endpoint in a linear fashion. In rejecting Claims 20 and 25, the Examiner admits that Larky does not disclose the use of a linear counter. However, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to select a linear counter. Applicant submits that even if it would have been obvious to select a linear counter, this is insufficient, as the Examiner must show a counter which counts flow control events issued by an endpoint in a linear fashion, as recited by Applicant. This showing has not been made, and it is respectfully submitted that the rejection of Claims 20 and 25 as being unpatentable over Larky is in error.

Q. Group IX: Rejection of Claims 21 and 26 Under 35 U.S.C. §103(a) as Being Unpatentable over Larky

Claims 21 and 26 are dependent on patentable independent Claims 19 and 24, as discussed above, and the arguments above with regard to the independent Claims 19 and 24 and Larky apply here. Additionally, Claims 21 and 26 are independently patentable as Larky fails to disclose or suggest a counter which counts flow control events issued by an endpoint in a circular fashion. In rejecting Claims 21 and 26, the Examiner admits that Larky does not disclose the use

of a circular counter. However, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to select a circular counter. Applicant submits that even if it would have been obvious to select a circular counter, this is insufficient, as the Examiner must show a counter which counts flow control events issued by an endpoint in a circular fashion, as recited by Applicant. This showing has not been made, and it is respectfully submitted that the rejection of Claims 21 and 26 as being unpatentable over Larky is in error.

IX. CONCLUSION AND RELIEF

Based on the foregoing, Applicant requests that the Board overturn the rejection of all pending claims and hold that all of the claims of the present application are allowable.

Respectfully submitted,

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Dated: May 11, 2004

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_____
Marilyn Bass May 11, 2004

X. APPENDIX

1. (Original) A method comprising:

traversing a schedule with a bus master, the schedule having a plurality of elements, each element having information pertaining to one of a plurality of endpoints;

executing transactions on a bus in accordance with the information pertaining to the plurality of endpoints;

counting flow control events issued by individual endpoints; and

skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events.

2. (Original) The method of Claim 1 further comprising:

stopping traversal of the schedule by the bus master;

resetting a flow control event counter for at least one endpoint to an initial value; and

restarting traversal of the schedule by the bus master.

3. (Original) The method of Claim 1 further comprising:

marking an element as a head of the schedule;

stopping traversal of the schedule by the bus master if, after marking an element as the head, the bus master completely traverses the schedule without executing any transactions; and

restarting traversal of the schedule by the bus master.

4. (Original) The method of Claim 3 further comprising:

resetting a flow control event counter for at least one endpoint to an initial value.

5. (Original) The method of Claim 1 further comprising:

stopping traversal of the schedule by the bus master after all endpoints have issued the threshold number of flow control events; and

restarting traversal of the schedule by the bus master.

6. (Original) The method of Claim 5 further comprising:

resetting a flow control event counter for at least one endpoint to an initial value.

7. (Original) The method of Claim 5 wherein traversal of the schedule by the bus master is restarted after an adjustable amount of time.

8. (Original) The method of Claim 5 wherein traversal of the schedule by the bus master is restarted after a fixed amount of time.

9. (Original) The method of Claim 8 wherein the fixed amount of time is ten microseconds.

10. (Original) A machine-readable medium that provides instructions, which when executed by a machine, cause the machine to perform operations comprising:

traversing a schedule with a bus master, the schedule having a plurality of elements, each element having information pertaining to one of a plurality of endpoints;

executing transactions on a bus in accordance with the information pertaining to the plurality of endpoints;

counting flow control events issued by individual endpoints; and

skipping elements in the traversal of the schedule, the elements being skipped corresponding to endpoints which have issued a threshold number of flow control events.

11. (Original) The machine-readable medium of Claim 10 which causes the machine to perform further operations comprising:

stopping traversal of the schedule by the bus master;

resetting a flow control event counter for at least one endpoint to an initial value; and

restarting traversal of the schedule by the bus master.

12. (Original) The machine-readable medium of Claim 10 which causes the machine to perform further operations comprising:

marking an element as a head of the schedule;

stopping traversal of the schedule by the bus master if, after marking an element as the head, the bus master completely traverses the schedule without executing any transactions; and

restarting traversal of the schedule by the bus master.

13. (Original) The machine-readable medium of Claim 12 which causes the machine to perform further operations comprising:

resetting a flow control event counter for at least one endpoint to an initial value.

14. (Original) The machine-readable medium of Claim 10 which causes the machine to perform further operations comprising:

stopping traversal of the schedule by the bus master after all endpoints have issued the threshold number of flow control events; and

restarting traversal of the schedule by the bus master.

15. (Original) The machine-readable medium of Claim 14 which causes the machine to perform a further operation comprising:

resetting a flow control event counter for at least one endpoint to an initial value.

16. (Original) The machine-readable medium of Claim 14 wherein traversal of the schedule by the bus master is restarted after an adjustable amount of time.

17. (Original) The machine-readable medium of Claim 14 wherein traversal of the schedule by the bus master is restarted after a fixed amount of time.

18. (Original) The machine-readable medium of Claim 17 wherein the fixed amount of time is ten microseconds.

19. (Original) An apparatus comprising:

a bus master to control transactions on a bus;

a schedule to contain information about a plurality of endpoints, the endpoints to be coupled to the bus; and

a counter to count flow control events issued by at least one of the plurality of endpoints, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events.

20. (Original) The apparatus of Claim 19 wherein the counter counts in a linear fashion.

21. (Original) The apparatus of Claim 19 wherein the counter counts in a circular fashion.

22. (Original) The apparatus of Claim 19 wherein the schedule includes a circular linked list of elements, each element to contain information about a particular endpoint.

23. (Original) The apparatus of Claim 19 wherein the schedule includes an array of elements, each element to contain information about a particular endpoint.

24. (Original) A system comprising:

a processor;

memory coupled to the processor;

a bus coupled to the processor and to the memory;

a bus master to control transactions on the bus;

at least one endpoint coupled to the bus;

a schedule to contain information about the at least one endpoint coupled to the bus; and

a counter to count flow control events issued by the at least one endpoint, such that the bus master suspends service to an endpoint which has issued a threshold number of flow control events.

25. (Original) The apparatus of Claim 24 wherein the counter counts in a linear fashion.

26. (Original) The apparatus of Claim 24 wherein the counter counts in a circular fashion.

27. (Original) The apparatus of Claim 24 wherein the schedule includes a circular linked list of elements, each element to contain information about a particular endpoint.

28. (Original) The apparatus of Claim 24 wherein the schedule includes an array of elements, each element to contain information about a particular endpoint.